





**MARS**, the Red Planet, has inspired wild flights of imagination over the centuries, and an intense scientific interest. Fancied to be the source of hostile invaders of Earth, the home of a dying civilization, and a rough-and-tumble mining colony of the future, Mars has proved to be fertile ground for science fiction writers, based on seeds planted by centuries of scientific observation. Mars has shown itself to be the most Earth-like of all the planets; it has polar ice caps that grow and recede with the change of seasons, and markings that appear to be similar to water channels on Earth.

American and Russian orbiters did not disclose any canals on Mars, but did find evidence of surface erosion and dried riverbeds, indicating the planet was once capable of sustaining liquid water. For millions of years, the Martian surface has been barren of water, and not subjected to the erosions and crustal plate movement that continually resurface Earth. Mars is too cool and its atmosphere is too thin to allow liquid water to exist. There is no evidence of civilizations, and it is unlikely that there are any extant life forms, but there may be fossils of life-forms from a time when the climate was warmer and there was liquid water.

Mars is a small rocky planet that developed relatively close to the Sun and has been subjected to some of the same planetary processes associated with the formation of the other "terrestrial" planets (Mercury, Venus, and Earth), including: volcanism, impact events, and atmospheric effects. Unlike Earth, Mars retains much of the surface record of its evolution. Layered terrains near the Martian poles suggest that the planet's climate changes have been periodic, perhaps caused by a regular change in the planet's orbit. Martian tectonism—the geological development and alteration of a planet's crust—differs from Earth's. Where Earth tectonics involve sliding plates that grind against each other or spread

apart in the seafloors, Martian tectonics seem to be vertical, with hot lava pushing upwards through the crust to the surface. Periodically, great dust storms occur that engulf the entire planet. The effect of the storms are dramatic, including dunes, wind streaks, and wind-carved features.

Mars has some remarkable geological characteristics including: the largest volcanic mountain, Olympus Mons (27 km high and 600 km across), in the solar system; volcanoes in the northern Tharsis region that are so huge they deformed the planet's sphericity; and a gigantic equatorial rift valley, the Vallis Marineris. This canyon system stretches a distance equivalent to the distance from New York to Los Angeles; Arizona's Grand Canyon could easily fit into one of the side canyons of this great chasm.

## Significant Dates

- 1965—Mariner 4 made first close-up pictures of the surface during flyby.
- 1969—Mariner 6 and Mariner 7 flybys resulted in high resolution images of the equatorial region and southern hemisphere.
- 1971—Mariner 9 became first satellite to orbit another planet.
- 1973—U.S.S.R. Mars 3 and Mars 5 first attempt to land on Mars.
- 1976—U.S.A. Vikings 1 and 2 orbited Mars. Viking Lander 1 provided first sustained surface science. Viking Lander 2 discovered water frost on the surface.
- 1988—U.S.S.R. probe Phobos returned detailed pictures of Phobos.
- 1996—Launch Mars Global Surveyor and Mars Pathfinder.
- 1997—Mars Pathfinder lands on Mars. Mars Global Surveyor arrives at Mars to map the surface from orbit.

## Fast Facts

<b>Namesake</b>	Roman God of War
<b>Distance from Sun</b>	
<b>Maximum</b>	249 million km
<b>Minimum</b>	206 million km
<b>Distance from Earth</b>	
<b>Maximum</b>	399 million km
<b>Minimum</b>	56 million km
<b>Rotational Period</b>	24.6 hours
<b>Equatorial Diameter</b>	6,786 km
<b>Equatorial Inclination to Ecliptic</b>	25.2°
<b>Gravity</b>	0.38 of Earth's
<b>Atmosphere</b>	
<b>Main Component</b>	Carbon Dioxide
<b>Pressure at Surface</b>	-8 millibars (vs 1,000 on Earth)
<b>Temperature Range</b>	143°C to +17°C
<b>Moons (2)</b>	Phobos (Fear), 21 km diameter Deimos (Panic), 12 km diameter
<b>Rings</b>	None
<b>Orbital Eccentricity</b>	0.093
<b>Orbital Inclination to Ecliptic</b>	1.85°
<b>Magnetic Field Density</b>	To be determined. Very weak, if any.

## About the Image

*This full-disk view of Mars is a merge of a morphologic mosaic and a color/brightness mosaic taken by Viking Orbiter 1 in 1980. The view centers at 20°N, 60°W. Note the north pole residual ice cap (top), Tharsis Montes (left), chaotic terrain, and Chryse outflow channels (NE of Valles Marineris). Kasei Valles appears at the center of Mars. The large dark region NE of Kasei Valles is Acidalia Planitia. Valles Marineris (bottom center) is a canyon system that stretches over 5,000 km in length and up to 8 km in depth. North of the eastern end of the Valles Marineris is the Chryse Planitia where Viking 1 landed. West of the Valles Marineris lie three of Mars' huge volcanoes, the Tharsis volcanoes, which appear as dark reddish spots. Each volcano is about 27 km high, over 350 km in diameter, and has a central crater at its summit. To the upper left of these three huge volcanoes is the most famous member, Olympus Mons, which is about 600 km across.*

### References

- 1) Views of the Solar System—Mars  
<http://bang.lanl.gov/solarsys/mars.htm>
- 2) Planetary Photo Journal: <http://photojournal.jpl.nasa.gov/>
- 3) Stardate, The University of Texas at Austin, McDonald Observatory, 2609 University Ave., #3.118, Austin, TX 78712